

FIRESOULT VERTICAL TAKEOFF AND LANDING TACTICAL UNMANNED AERIAL VEHICLE (VTUAV) SYSTEM



Navy ACAT II Program

Total Number of Systems:	23 (12 USN, 11 USMC)
Total Program Cost (TY\$):	331.6M

Prime Contractors

Northrop Grumman-Ryan
Aeronautical Center

SYSTEM DESCRIPTION & CONTRIBUTION TO JOINT VISION 2020

The Vertical Takeoff and Landing Tactical Unmanned Aerial Vehicle (VTUAV) system is to provide Reconnaissance, Surveillance, and Target Acquisition (RSTA) and communications relay capability in support of littoral operations for the Navy and Marine Corps. The purpose of the VTUAV system is to collect and pass information utilizing an airborne sensor platform that will provide the commander with an extended and enhanced battlespace situational awareness. VTUAV will incorporate an Electro-Optic (EO/Infrared (IR)/Laser designator payload, and is to deliver timely, accurate, and complete information about the Commander's area of interest in near real-time. VTUAV will provide the tactical commander with *information superiority*, contributing to the *full-dimensional protection* of his force and *precision engagement* of the enemy.

A VTUAV system consists of three air vehicles with payloads, a ground control element (ship-based for the Navy and HMMWV-based for the Marine Corps), data link equipment, a remote data terminal, and associated ground support equipment. The FireScout air vehicle is based on the Schweizer Aircraft Corporation Model 330 manned turbine helicopter. The most significant change from the manned version is the replacement of the cockpit with a redundant flight control system including actuators, avionics, and software to support unmanned flight and payload operations. The FireScout has a gross takeoff weight of 2,550 pounds, cruises at 110 knots, and can loiter on-station at 110 nautical miles for over three hours. An existing Allison Rolls Royce gas turbine engine powers the air vehicle. The ground control element will use the Tactical Control System architecture to support system functionality and intelligence dissemination to other C⁴I nodes.

The operational tempo calls for one VTUAV system to provide 12 continuous hours on station at 110 nautical miles. This will be accomplished with more than one air vehicle and conducting relief on station operations. The command and control architecture using the tactical command data link and ARC 210 UHF/VHF radio allows one ground station to monitor up to three air vehicles simultaneously while receiving imagery from one of the airborne platforms.

BACKGROUND INFORMATION

Between 1998 and 1999, the Navy conducted extensive technical demonstrations with vertical takeoff and landing (VTOL) unmanned aerial vehicles, including shipboard demonstrations last winter. Three contractors participated in these demonstrations: Bell Helicopter, SAIC, and Bombardier. As a result of these demonstrations, the Navy decided that a VTOL capability was technically feasible to meet their mission needs. Therefore, when in November 1998, the JROC directed the Navy and the Army to pursue separate air vehicle solutions to satisfy their tactical UAV requirements, the Navy submitted their operational requirement for a vertical takeoff and landing tactical UAV. The JROC subsequently validated the Navy's VTUAV ORD in January 1999, with the following Key Performance Parameters (KPPs): ability to conduct VTOL operations from a land-based site and all air capable ships; ability to maintain a steady state hover; automatic launch and recovery capability; 200 pound payload capability; deck restraining capability; ability to transfer control of the air vehicle from one ground control station to another; and ability to use either JP-5 or JP-8 heavy fuel. Although the ORD did not specifically identify a KPP for interoperability, the test and evaluation plan will examine the interoperability capabilities of the VTUAV system.

On August 31, 1999, the Assistant Secretary of the Navy for Research, Development, and Acquisition (ASN(RDA)) approved the VTUAV acquisition strategy. The program office subsequently released their official request for proposals. ASN(RDA) approved Milestone II on January 21, 2000, and the VTUAV contract was awarded on February 9, 2000 to Northrop Grumman (Ryan Aeronautical Center) for the EMD of the FireScout VTUAV systems. Note that of the three contractors participating in the technology demonstrations, only one, Bell, competed for the VTUAV contract against Sikorsky and Northrop Grumman.

TEST & EVALUATION ACTIVITY

No operational testing was conducted this year on the VTUAV. This office approved the TEMP in August 2000. One year of EMD is to be followed by an LRIP contract for two systems in March 2001. The LRIP decision will be supported by information obtained during design reviews and limited developmental testing with prototype air vehicles and ground components. Initial operational testing is scheduled for July 2002. IOT&E will be conducted with the first LRIP system, a Marine Corps land-based VTUAV System with one L-class ship control station.

Prior to the contract award, 39 manned flights of the Model 379 (for a total of 41 flight hours) were accomplished. In January 2000, the first unmanned fully autonomous flight took place at NAWC China Lake. The same prototype air vehicle (P1) successfully completed additional flight testing in June 2000. Several anomalies were detected related to flight computer capacity, engine starts, engine RPM, tachometer, and radar altimeter. The contractor developed solutions to the anomalies and flight testing resumed in November 2000. After a successful autonomous flight, the air vehicle crashed into the ground and was totally destroyed. An accident investigation is underway. Flight testing with a manned platform will continue until another unmanned prototype is available in late 2001.